

The background of the slide is a photograph of a wetland area. In the foreground, there is a body of water reflecting the sky. A small island or peninsula in the middle ground is covered with tall green reeds and grass. A group of about ten geese are standing on this island. In the far background, a city skyline with several tall buildings is visible under a clear blue sky.

Climate Change and Integrated Regional Water Management in California: A Preliminary Assessment of Regional Approaches

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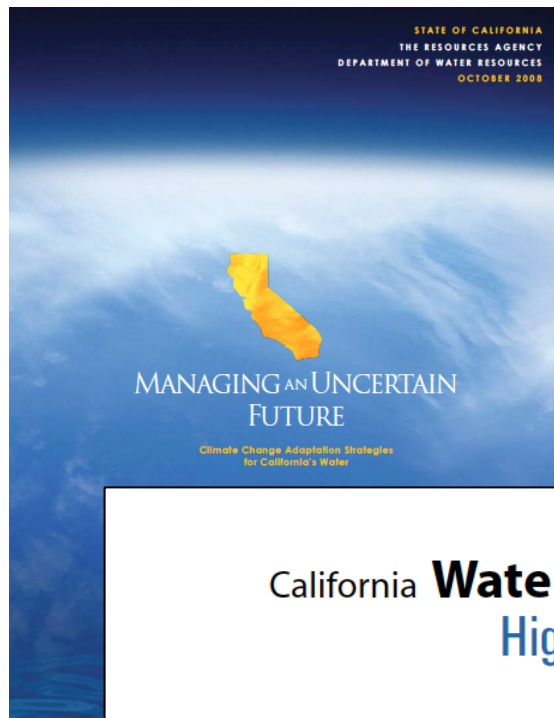
University of California Berkeley

September 14, 2012

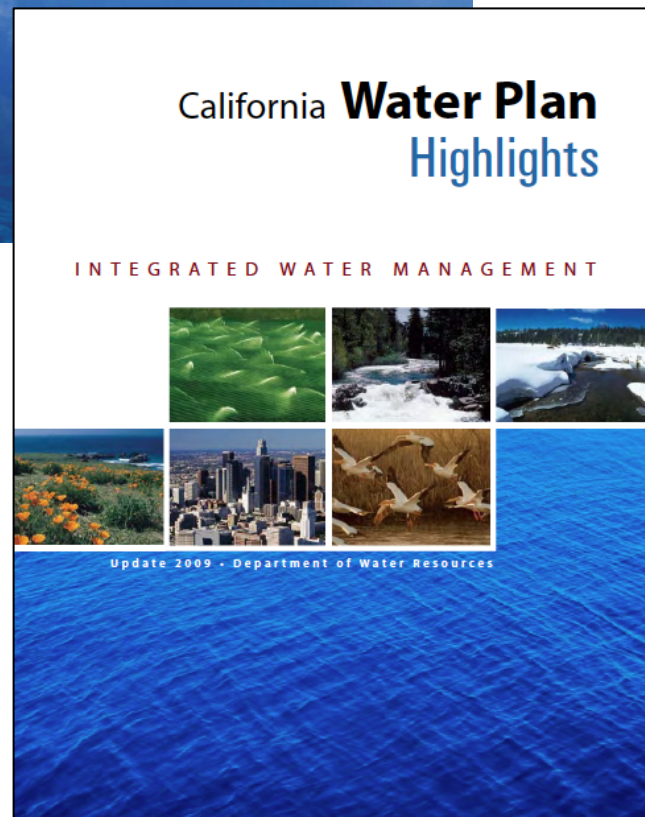
IRWM in California:

Supporting adaptation across diverse contexts





DWR's Managing an Uncertain Future, 2008:
IRWM as one of 10 key adaptation strategies



California Water Plan Update, 2009:
IRWM as a “critical framework for actions to address the uncertainties presented by climate change as well as other risks to California’s water future.”

Talk Outline

- California's Integrated Regional Water Management (IRWM) process
- IRWM climate change requirements
- Overview of regional climate change efforts
- What additional guidance/support may be needed?

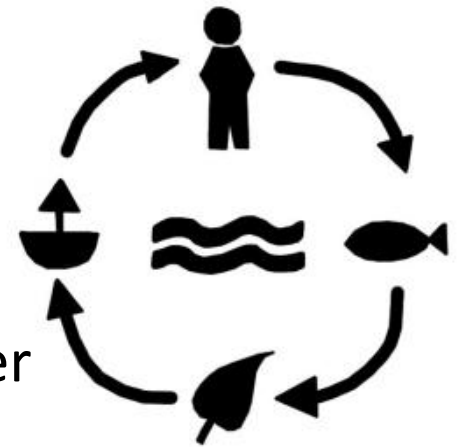
California's Integrated Regional Water Management Process (IRWM)

Established in 2002 by IRWM Planning Act

Managed by DWR in consultation with other agencies

Goals:

- Support integration across water supply, quality, environment, flood management
- Promote regional collaboration and diversify water management portfolio
- Reduce conflict, support innovation, address needs of disadvantaged communities



IRWM Planning:

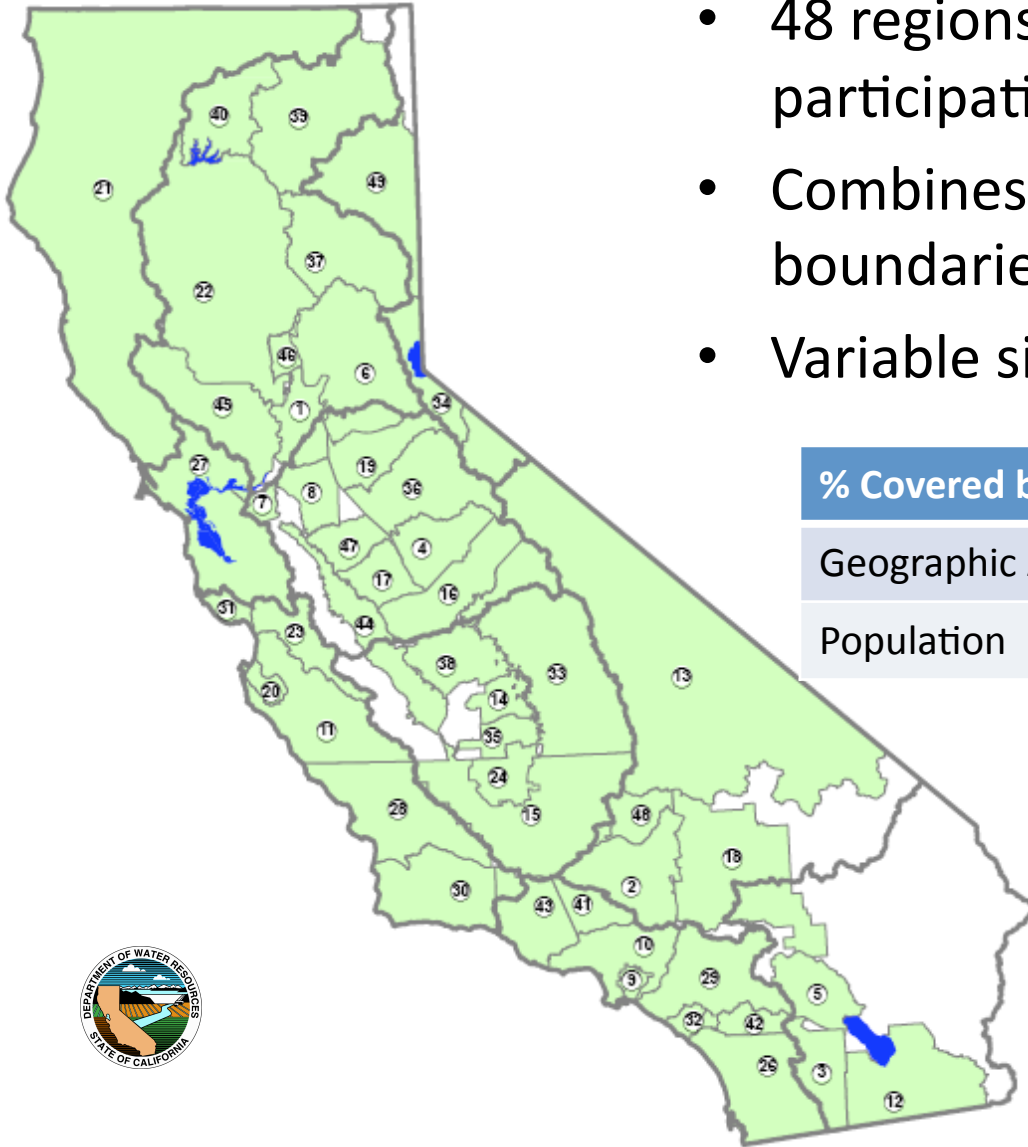
Voluntary, stakeholder driven process in response to state incentives

- Form IRWM Region
 - Regional Acceptance Process: “maximize opportunities for integration”
- Develop IRWM Plan
 - Planning grants: up to \$1 million/region
- Apply for project funding (Props. 50, 84, 1E)
 - \$1.3 billion total
 - \$750 million awarded so far
- Future bond funding?

IRWM Regions – 2012

- 48 regions, largely self-defined by participating water stakeholders
- Combines watershed and jurisdictional boundaries
- Variable size: 170,000 to 12 million acres

% Covered by IRWM Region	2005	2009	2011
Geographic Area	54	83	87
Population	95	97	99



DWR – Broad Guidance for IRWM Plans

IRWM Plan Standards

Governance	Data Management
Region Description	Finance
Objectives	Technical Analysis
Resource Management Strategies	Relation to Local Water Planning
Integration	Relation to Local Land Use Planning
Project Review Process	Stakeholder Involvement
Impact and Benefit	Coordination
Plan and Performance Monitoring	Climate Change

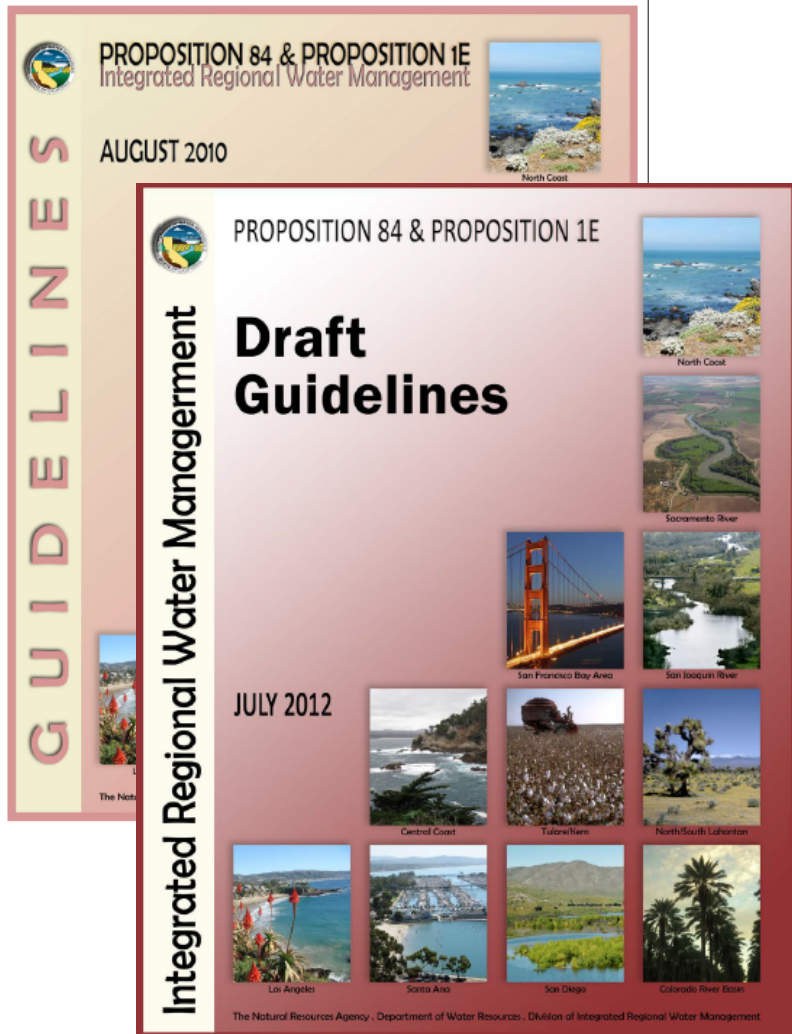
IRWM and Climate Change: 2008 IRWM Planning Act

IRWM Plans must include:

- “consideration of greenhouse gas emissions of identified programs and projects”
- “evaluation of the adaptability to climate change of water management systems in the region”

California Water Code §10541(e)(9) and (10)

Climate Change Requirements - Adaptation



IRWM regions must undertake:

- Vulnerability assessment
- Prioritization of vulnerabilities
- Plan/methodology for further study of impacts

Climate Change Priority for project funding:

- Conjunctive water mgmt
- Water use efficiency
- Water system modifications
- Migration corridors, upper watershed protection

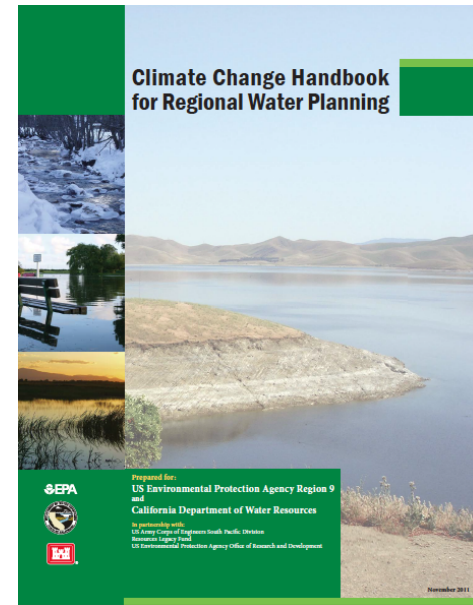
Resources for Climate Change Planning

Climate Change Handbook:

- Vulnerability assessment (40-question checklist)
- Impacts assessment methods (primarily water supply)

DWR Climate Change Program

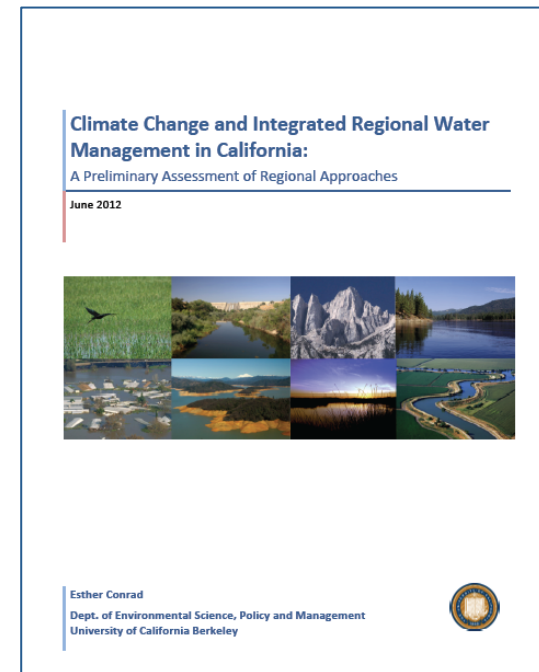
- 4 regional climate change specialists
- Additional support needed?



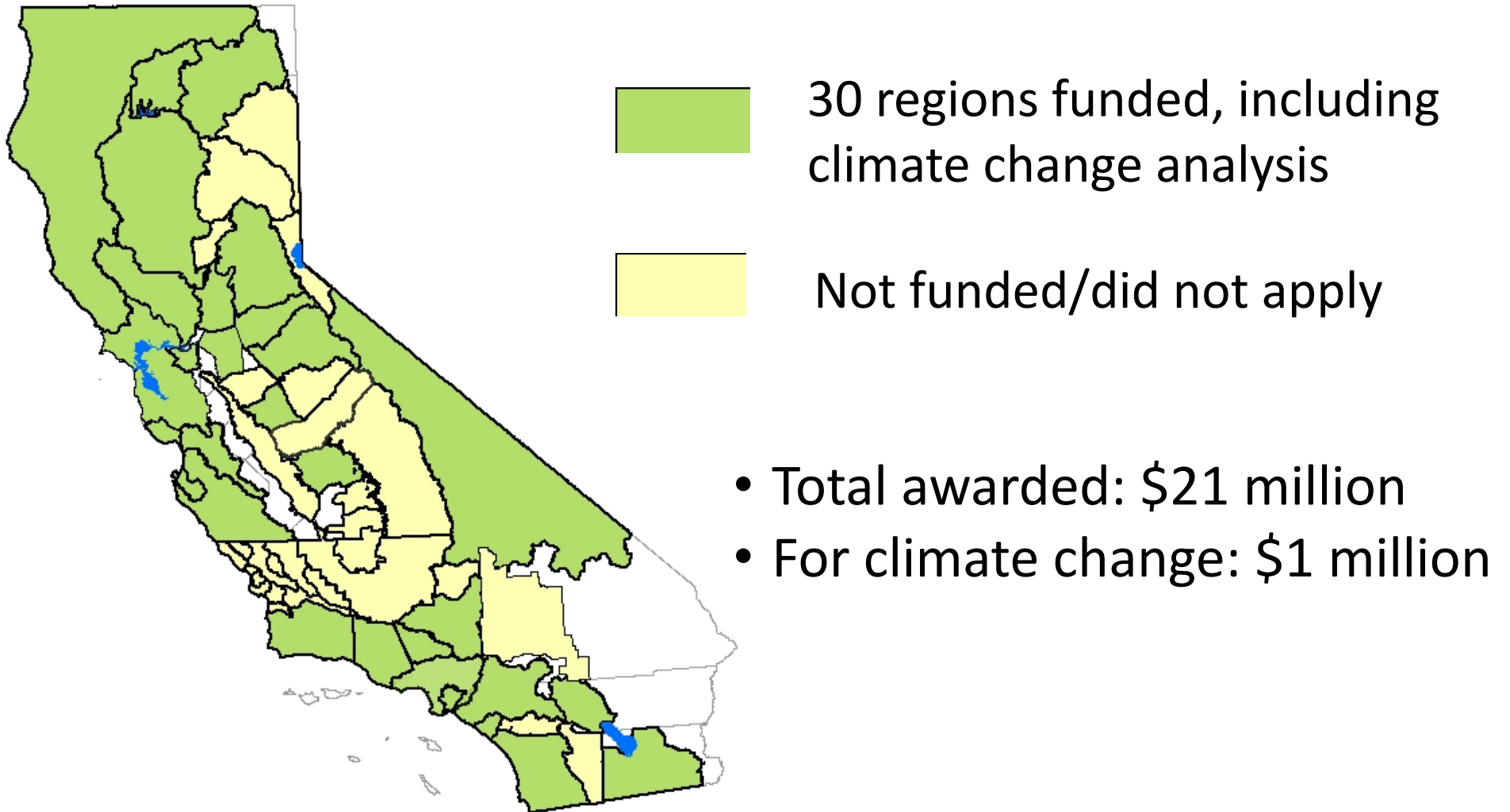
<http://www.water.ca.gov/climatechange/CCHandbook.cfm>

Preliminary assessment of IRWM regional approaches to climate change

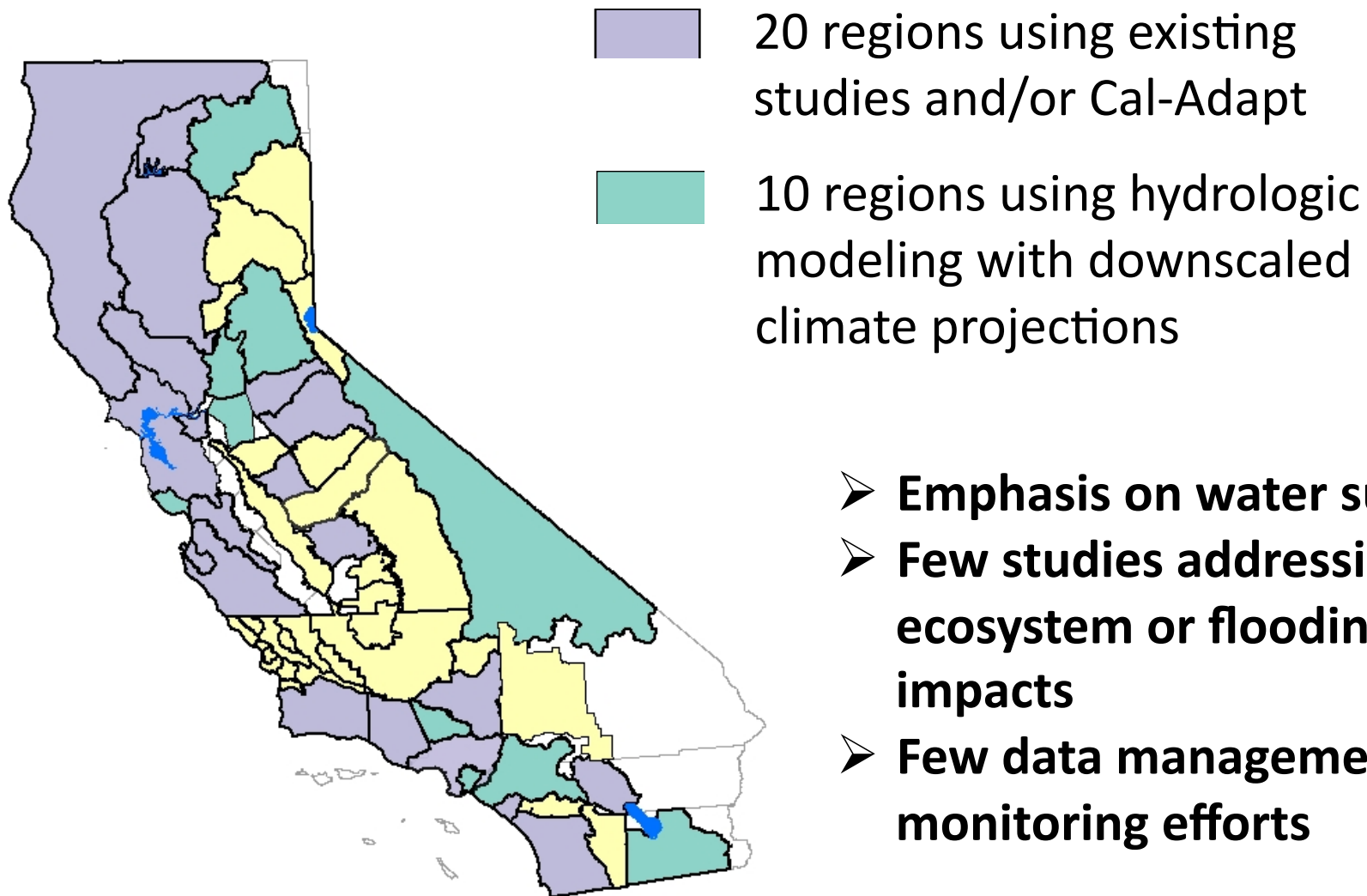
- Analysis of Prop 84 Round 1 Planning and Implementation grants
- Interviews with reps from 18 IRWM regions, conducted by DWR regional climate specialists



Round 1 Planning Grants



Types of climate impact assessments

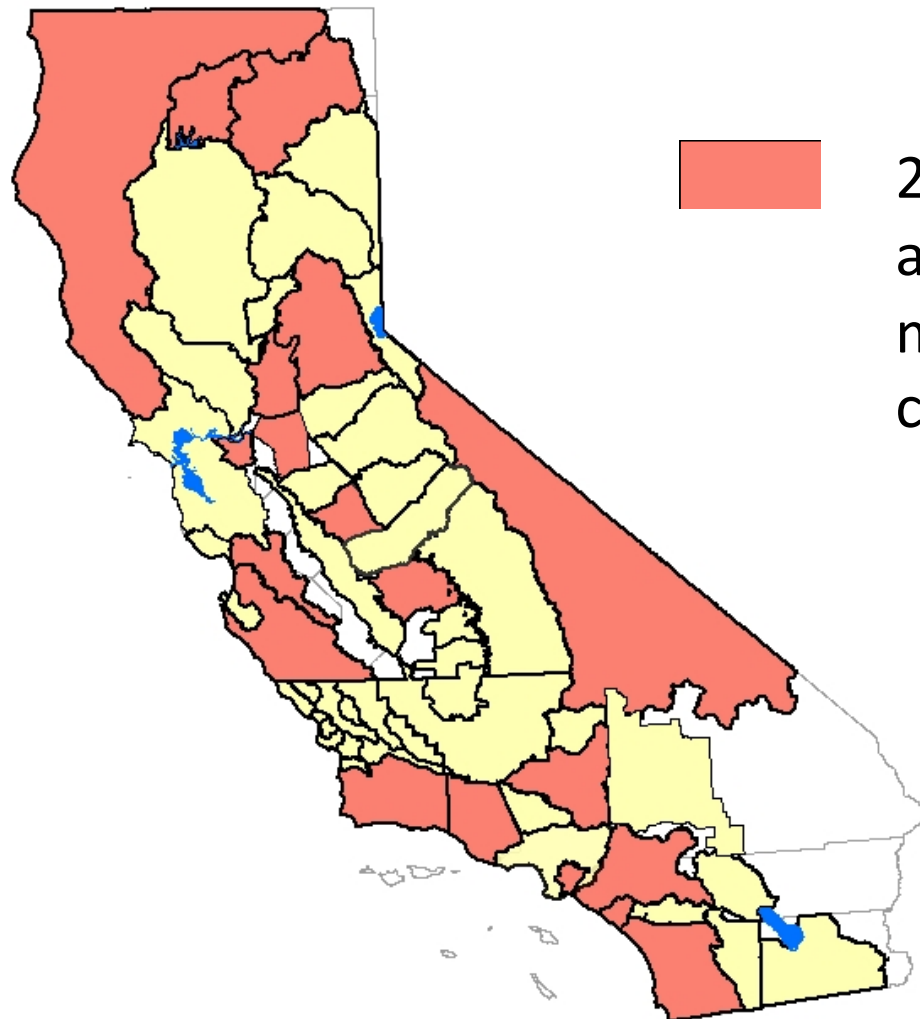


- **Emphasis on water supply**
- **Few studies addressing ecosystem or flooding impacts**
- **Few data management/monitoring efforts**

Regional-level modeling efforts

Climate Models/Scenarios	Climate Action Team scenarios DOI/LLNL dataset Cal-Adapt (download data)
Hydrologic Models	VIC, USGS Basin Characterization Model, SacIWRM, MOCASIM, WEAP
Partners	US Geological Survey US Bureau of Reclamation UC San Diego

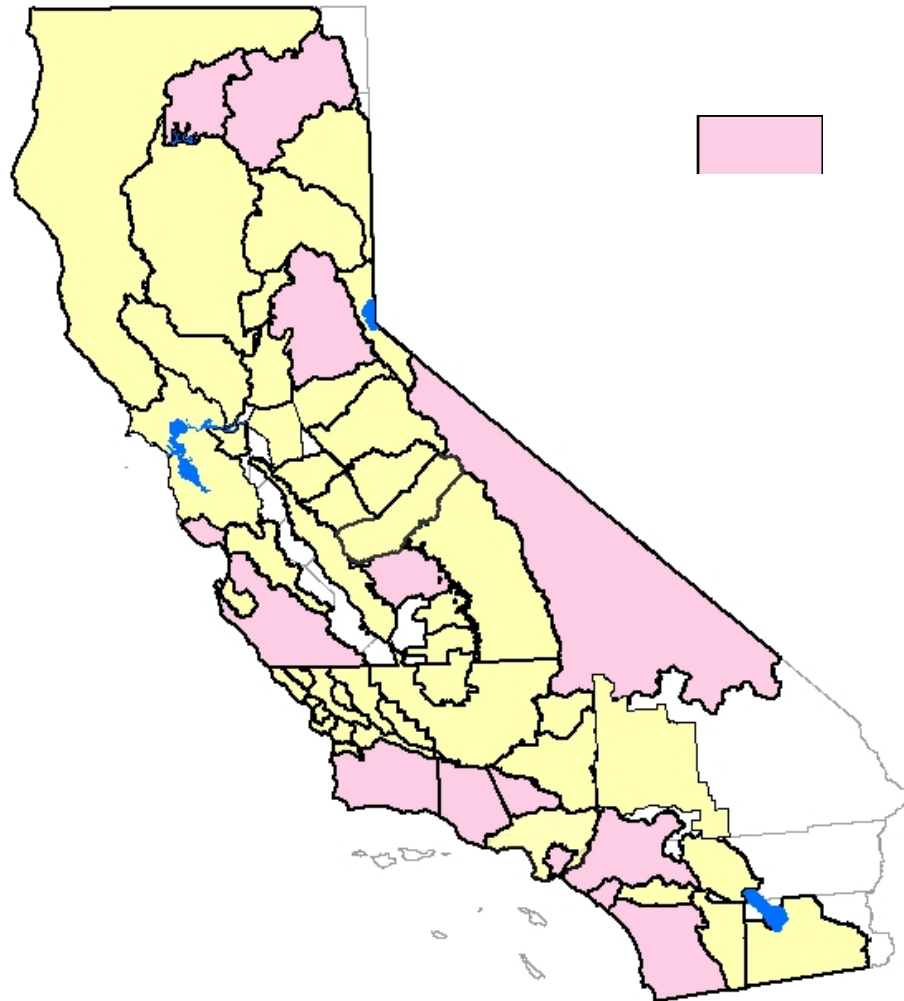
Potential for engaging local stakeholders in climate change planning



24 regions with workshops,
advisory groups, and public
meetings related to climate
change

- In some regions,
challenging in practice?

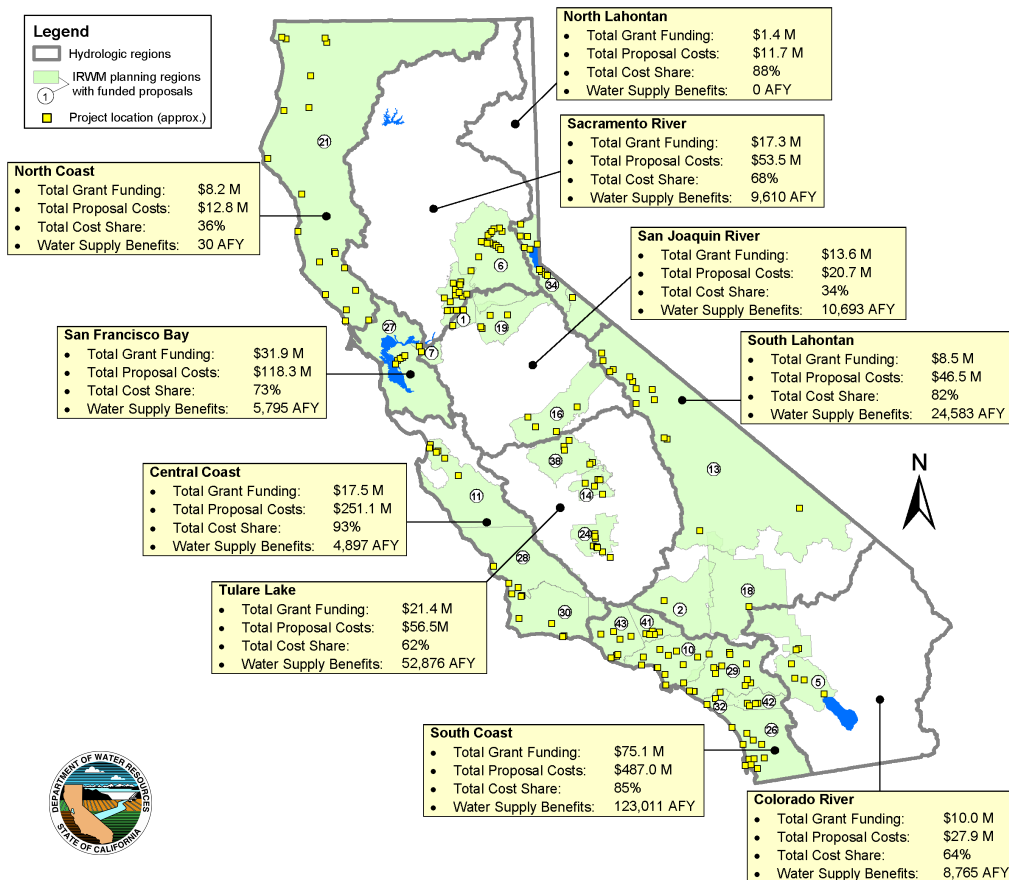
Potential for inter-regional collaboration



15 regions exploring inter-regional collaboration on climate change

- **Support from DWR needed to realize multi-region analyses?**

Round 1 Implementation Grants



- 192 funded projects
- \$204 million
- 73% classified under Climate Change Priority
- Conjunctive water mgmt, water use efficiency

➤ **Future rounds:**
project priorities
informed by
vulnerability
assessment?

What additional climate change guidance/support may be needed?

- In selecting and using climate model outputs, integrating into hydrologic models
- Assessing ecosystem/flooding impacts
- Supporting regional-level monitoring/data management efforts
- Facilitating Inter-regional collaboration opportunities

Thank you!

Special thanks to DWR regional climate change specialists **Erin Chappell, Peter Coombe, Lauma Jurkevics, and Michelle Selmon** for their interviews with IRWM regional representatives, and to **John Andrew, Rolf Frankenbach, Elissa Lynn and Andrew Schwarz** (DWR) for their valuable feedback on this project.

Questions?

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